Attachment 19

TOWN OF WESTON

WESTON, CONNECTICUT

A PROPOSED DOG PARK

DAVIS HILL ROAD

TRAFFIC IMPACT ANALYSIS

FINAL DRAFT

PREPARED FOR
BOARD OF SELECTMEN

PREPARED BY:
WESTON TOWN ENGINEER'S OFFICE
John Conte P.E.

AUG 01 2017

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INTRODUCTION

This report documents the findings and conclusions of a traffic impact analysis conducted for the Board of Selectmen for a proposed 3.5 acre dog park submitted to the Board for site plan approval. This facility is to be located on a large tract of land, Assessor's Map 17, Block 1, Parcel 17, located south of Lords Highway East. The entrance/exit driveway is to be located on Davis Hill Road, across the street from house number 146 Davis Hill Road.

The parcel has frontage on both Davis Hill Road and Lords Highway East, however, only a portion of the property on Davis Hill Road is included in this development (see Appendix A site plans). Access to the site will be restricted to Davis Hill Road.

The dog park will be located on a Town-owned parcel totaling over 35 acres. There are numerous stone walls within the property, sectioning off the property into square parcels. The dog park will utilize two of the sectioned-off parcels. A 15 car parking lot will be located on the 2.5 acre section which is adjacent to Davis Hill Road. The park itself will be located on a sectioned-off parcel totaling 3.5 acres. The park will be adjacent to the parking lot. A dog park use is typically utilized more extensively on the weekends during the peak periods when Davis Hill Road traffic volumes are lower than on weekdays. The site users also tend to arrive or depart during non-commuter peak traffic hours during the weekdays, as well, thus not adding to the highest travel hours on Davis Hill Road.

Currently, the site property is undeveloped. A linear pave and gravel driveway will extend to the parking area from Davis Hill Road, as shown in the plans found in Appendix A. All site traffic will utilize the dog park driveway with the intersection of Davis Hill Road to enter and exit the site.

The anticipated build-out would likely occur within a year or two, and certainly within five years, full traffic use will be developed for the area. See Appendix B – location map for project location. Discussions with the Board of Selectmen included an agreement that an in-depth analysis of the site driveway intersection on Davis Hill Road would be conducted to determine any impacts to that intersection. Other intersections are approximately 0.2 miles from the site driveway and are considered remote from the site access/egress. Therefore, the site driveway, where all site trips will enter Davis Hill Road, is to be the concentration of this study.

This traffic report has been prepared for submission to the Board of Selectmen, the review agent for site plan projects concerning Town-owned properties. The traffic-related issues addressed in this report are:

- Collect traffic and speed counts on Davis Hill Road near the proposed site driveway intersection for 24 hours during weekdays.
- Analyze the road/site driveway intersection capacity to handle anticipated traffic volumes without the project, during the peak AM, MD (mid-day) and PM periods in the year 2022, as counted for weekdays.

- Project future traffic in five years, 2022, with full build-out using an increase of 1% growth per year for a period of 5 years, for the background traffic at the study intersection, during AM, MD, and PM peak weekday travel hours.
- Estimate site-generated traffic volumes and their anticipated distribution onto Davis Hill Road.
- Review of accident history at the Davis Hill Road/site driveway intersection and any accidents along Davis Hill Road nearby to the study intersection.
- Measurement of available sight distance for site driveway onto Davis Hill Road.

Evaluation and analysis included a field review of existing conditions (i.e. lane widths, road layout and alignments), collection of two-way, hour per hour and 24 hour traffic counts on Davis Hill Road; and the creation of AM, MD, and PM peak hour weekday counts. Since the study intersection does not exist today, the 24 hour counts include all traffic to be analyzed for the dog park scenario. Capacity analysis of pre-versus post-construction was conducted to determine what effect the site will have on Davis Hill Road's ability to accommodate the new site traffic. A review of accident data for the study intersection of the dog park driveway and Davis Hill Road is included. The traffic analysis concentrated on the single intersection that is most likely to be impacted by the proposed development, namely

- Davis Hill Road at proposed site driveway.

EXISTING CONDITIONS

The existing roadway, Davis Hill Road and the proposed intersection to the site were evaluated, including land uses, geometrics and traffic volumes.

LAND USES

Located within the vicinity of the proposed development along Davis Hill Road, there are residential frontage lots with no new residential development. There are only two vacant parcels located on Davis Hill Road; one 14+ acre parcel with frontage on Davis Hill Road and Hill Farm Road and the other is a 13+ acre parcel with a large wetland area (see map in Appendix I growth area map).

EXISTING ROADWAYS

The roadways servicing the study area, which may be most impacted by the proposed project, include Davis Hill Road and the site driveway.

DAVIS HILL ROAD

Davis Hill Road is a Town-owned, two-lane, two-way rural roadway approximately 18-22 feet in width with only one area at 18 feet all other areas are at 22 feet, spanning between Valley Forge Road to the north and Steep Hill Road to the south. The site driveway is approximately 0.2 miles south of the intersection of Davis Hill Road and Lords Highway East.

Several minor roads intersect Davis Hill Road within a half a mile of the site study intersection, with minor traffic volumes added to the Davis Hill Road commuter traffic during weekday AM and PM peak travel hours. Appendix D shows the hourly traffic volumes counted adjacent to the proposed site driveway, with 24-hour volume graphs indicating a heavier weekday commuter pattern southbound in the AM and northbound in the PM peak hours. Midday weekday traffic volumes dropped. The posted speed limit on Davis Hill Road is 25 mph, approaching the study intersection for both directions.

PROPOSED SITE DRIVEWAY

The proposed site driveway is to be an 18-foot wide paved and gravel surface intersecting Davis Hill Road. The site driveway will traverse the site to the dog park area. Stopping sight-distance measurements at this intersection are provided in this report.

TRAFFIC COUNTS

In order to quantify existing conditions and identify predominant traffic patterns, since there is no site traffic using the driveway today, the Town Engineer's office and the Weston Police Dept. had 24-hour, 2-way automatic traffic recorder (ATR) counts performed from the afternoon on Wednesday, May 31, 2017, to Friday morning on June 1, 2017 (see Appendix D) to obtain full 24 hour, hour by hour, traffic volume for Davis Hill Road with peak periods utilized as turning movement traffic events at the proposed driveway. On Wednesday, May 31, 2017, Godfrey Road East was closed to thru traffic from 8am to 4pm, with only local traffic being allowed to pass. Godfrey Road East is located north of Davis Hill Road. The two roads are connected primarily by Valley Forge Road. Catbrier Road and Raven Wood Road are connected to Davis Hill Road by way of Lords Highway East. Manual traffic counts were conducted on Davis Hill Road, Wednesday, May 31, 2017, during peak hours of 7:30am to 9:30am, 12:30am to 1:30pm, and 3:30pm to 5:30pm. Manual peak-hour counts were compared to the automated peak-hour counts of June 1, 2017, to determine if the road closure of Godfrey Road East had any impact of increasing traffic volumes. This comparison was done to forecast any increase in future traffic volumes once the dog park is in full operation due to area road closures. The comparison showed a decrease in traffic volumes during the closure of Godfrey Road East.

CAPACITY ANALYSIS

Using the turning movements traffic counts shown in appendix "D" existing conditions capacity analyses were performed for the existing study intersection. The analyses were performed using the Highway Capacity Software by Trafficware. The Town of Weston does not have in its possession the Highway Capacity Software. To utilize that particular software the town engineer's office incorporated the help of the engineering staff of the Western Connecticut Council of Governments located in Sandy Hook Connecticut. The engineering staff at the council provided assistance and software to analyze the pre and post traffic conditions of the proposed Weston Dog Park.

Capacity analysis assesses traffic operations in terms of Level of Service (LOS), which is a concept that was developed by transportation engineers to quantify the level of operation of intersections and roadways. LOS measures are classified in grades "A" through "F" indicating a range of operation from LOS "A", signifying the least congested level of operation, to "F", the worst, which is considered failure.

LEVEL of SERVICE
Criteria for Unsignalized Intersections

LEVEL of SERVICE (LOS)	CONTROL DELAY Per Vehicle (SEC)
A	0-10
B	>10 and<15
C	>15 and <25
D	>25 and <35
E	>35 and <50
F	>50

Generally, LOS "D" is considered the threshold limit of acceptable operation for intersections.

The Highway Capacity Manual classifies roadways into three classifications- Class I, Class II and Class III (see appendix H). Davis Hill Road is classified as a Class III two lane highway. The software takes into account the most critical peak hour of the number of vehicles using the roadway. In this case it was determined by the town engineer and the engineering staff at the council that the most critical hour was from 5pm to 6pm. The software also takes into account lane width, grades, terrain type, access point density (driveways entering Davis Hill Road within the study area). With that information the program determines the percent free flow speed (PFFS). The PFFS is then compared to the level of service classification for PFFS for a class III two lane highway (see appendix J two-lane highways users' guide).
The analysis for the year 2017 no build condition on Davis Hill Road found that the PFFS was a 90.4%. Based on the highway capacity manual a PFFS of 90.4% is a level of service "B". For the project year of 2022 the PFFS was 90.1% indicating a level of service "B" for the study area (see appendix K). The engineering staff at the council also did a computer run conducting an analysis of the proposed intersection of Davis Hill Road and the proposed driveway to the dog park for

the year 2022 (see appendix L). The analysis indicated the level of service for the intersection for the year 2022 is LOS "A".

Based on the information provided above and in appendix "K" we can see with the highway capacity manual software that the Davis Hill Road movements experience excellent levels of service, LOS "B". Volumes on this road during weekday's peak at morning and evening commute hours, however the volumes are relatively low with sizable reserve capacity to accommodate significantly more traffic before delays are noticeable.

ACCIDENT DATA

Accident data for the years 2012 through 2017 was retrieved from the Weston Police Dept.'s accident record system for the entire length of Davis Hill Road. Those accidents are highlighted in Appendix F. The print out from the Police Dept. shows where accidents occurred in front of houses by house numbers. Where no house number appears, an accident occurred in an area on Davis Hill with no houses nearby. The dog park entrance is located across the street of house number 146. The accident report indicates most accidents occurred at the southern end of Davis Hill Road. One accident occurred north of the dog park. Since the new driveway does not exist, we looked for any accidents close to the proposed driveway location and found none.

EXISTING SIGHT DISTANCE

Existing sight distances at intersecting roadways or driveways are an important factor in the safety of both an exiting vehicle and an approaching vehicle. As part of this report, the Town Engineer's office has measured in the field sight distance at the location of the proposed site driveway on Davis Hill Road. The measured sight distance for a vehicle exiting the site driveway is shown in Table 1.

Two types of sight distance requirements for intersecting roadways or driveways used in this report are the Connecticut Department of Transportation Highway Design Manual and the Town of Weston Subdivision Regulations. The stopping sight distance (SSD) is based on the time it takes an approaching vehicle to come to a complete stop, once it has seen an object. For a 30 mph speed limit, the SSD for oncoming traffic to safely stop is 200 feet on a flat roadway (see Appendix G). However, Davis Hill Road has a slope of 4.8% down grade approaching from the north to the site intersection, requiring a SSD of 215 feet and a 3.2% upgrade slope approaching from the south to the site intersection, requiring a SSD of 200 feet. The area at the proposed intersection is a level grade. Since the Town of Weston is exempt from its zoning regulations, it is recommended to use the CT DOT regulations. The sight distance for vehicles approaching from the south exceeds the criteria set forth by the CT DOT. The sight distance for vehicles approaching from the north does not meet the criteria. To correct the sight distance to the north,

TABLE 1

Summary of sight Distance Analysis

Stopping Sight Distance (Feet)-30 MPH

Location	CT D.O.T Criteria	Town of Weston Criteria	Measured SSD Distance	SSD Criteria Met
Site Driveway at Davis Hill Road				
From the North	215	250	177	No
From the South	200	250	400	Yes

Note:
The Town of Weston requires a 250 foot
Sight distance for new subdivision roads
And driveways.

numerous trees must be removed and the existing shoulder must be lowered to provide the 215 feet of clear sight line (see Appendix C).

It should be pointed out that the traffic count and speed results in Appendix D indicate that the 85th percentile speed on Davis Hill Road is 31:45mph for the north bound lane and 27:03mph for the south bound lane. That speed should be police-controlled and it is recommended that 25 mph speed limit signs be placed a distance of 250 feet minimum from the proposed driveway in the north and south bound lanes. At the present time, there is only one 25 mph sign at the southern end of Davis Hill Road. Also, it is recommended that Park Entrance Ahead signs be placed 300 feet from the proposed driveway in both directions to warn drivers of the site entrance ahead. Again, there were no reported accidents in the immediate vicinity of the proposed site driveway study intersection.

PROPOSED DEVELOPMENT TRAFFIC IMPACTS

Analysis Methodology and Assumptions

Traffic impacts have been estimated in order to determine the extent of change in traffic conditions caused by the development of this project. In order to make this determination, the following assumptions and methodology were employed:

- The proposed development will be built out within five years.
- Existing background traffic in the site area will grow by 1.0% per year for the 5 year study period.
- The existing year 2017 counts were expanded by 5.1% to arrive at the Future 2022 No-Build traffic volumes. Analysis of these future volumes without the site trips helps determine how well the intersection will operate even if the project is not constructed.
- Traffic generation estimates from the project were prepared for the critical weekday AM, MD and PM peak periods. Trip generation was also calculated from field counts of the Town of Easton Dog Park.
- Cumulative traffic impacts of the proposed project were then determined by superimposing the project-generated traffic onto the Future 2022 No-Build background adjusted traffic, to create the "2022 Build" scenario for the study intersection.

TRIP GENERATION AND DISTRIBUTION

Trip generation estimates were prepared for the proposed development. Various studies have determined that particular land uses, such as residential and recreational land uses, exhibit certain traffic volume characteristics:

1) Total entering and exiting volume within a 12-hour period with parks open between sunrise and sunset.
2) Peak hour traffic characteristics. The traffic generation data is then compared to specific land use characteristics, such as the number of parking spaces and/or the gross square

footage of the park. This data was then utilized to develop site traffic volume estimates for this project.

To determine accurate traffic volumes caused by the operation of a dog park, the Town Engineer's office conducted field counts of the Easton Dog Park from 6:30am to 6:00pm on the date of Saturday June 10, 2017 for the entire day. The weather on June 10, 2017 was sunny and warm. Easton was chosen because of the similarities to Weston concerning zoning and population. Total vehicles for the time frame mentioned above were 18 vehicles.

For trip generation values of the total number of vehicles trips per day anticipated from the proposed dog park, the town engineer and the engineering staff from the council came up with an anticipated 25 trips per day. That calculation was based using the volume of traffic found at the Easton Dog Park taking into account the difference in population and the annual traffic growth to the year 2022. See calculations below.

DOG PARK TRIP GENERATION
18 trips/day x 10,179 = 24 x 1.05% = 25 trips/day
7,490
Measured @ x Population x 1% Annual = Trips per Day
Easton Dog Difference Traffic Growth
Park to 2022
(Weston Population 10,179)
(Easton Population 7,490)

Assuming 25% of ADT = Peak Hour
25 x (0.25) = 6 Trips/Hour = 3 North Bound
3 Southbound

Peak hour volume 5pm to 6pm 2017
19 veh./hour North Bound 18 veh./hour South Bound
North Bound 19 veh. /hour 2017
20 veh. /hour 2022 (+5%)
+ 3 veh. /hour Left into Dog Park
23 veh./hour North Bound 2022
South Bound 18 veh./hour 2017
19 veh./hour 2022 (+5%)
+ 3 veh./hour Right into Dog Park
22 veh./hour South Bound 2022
See Figure No 1

FUTURE YEAR (2022) BUILD TRAFFIC VOLUMES

Site generated trips from this development were added to the Future (2022) No-build traffic volumes to arrive at Future (2022) Build traffic volumes. Those peak No-build and Build peak traffic volumes generated by the site use are illustrated in Figures 1 for weekdays. Growth rates are based on a 1% growth rate per year for a period of five years. The land surrounding the proposed dog park was evaluated to determine if there were large areas still under-developed (see Appendix I future area growth map). There are only two large parcels privately-owned with the area of the proposed dog park, a 14+ acre site and a 13+ acre site. The remaining areas are developed.

STUDY CONCLUSIONS

The analysis indicates that Davis Hill Road has sufficient capacity to accommodate the estimated traffic from the proposed dog park with no significant increased delay. The weekday volumes traveling on Davis Hill Road indicate a commuter pattern of morning peak traffic heading south and a return peak flow during the evening commute hours heading north. In winter months, if snow fall occurs, the parking lot will not be plowed, causing the closure of the park during winter, making it a seasonal use. If snow fall does not occur, the park will remain open during winter months.

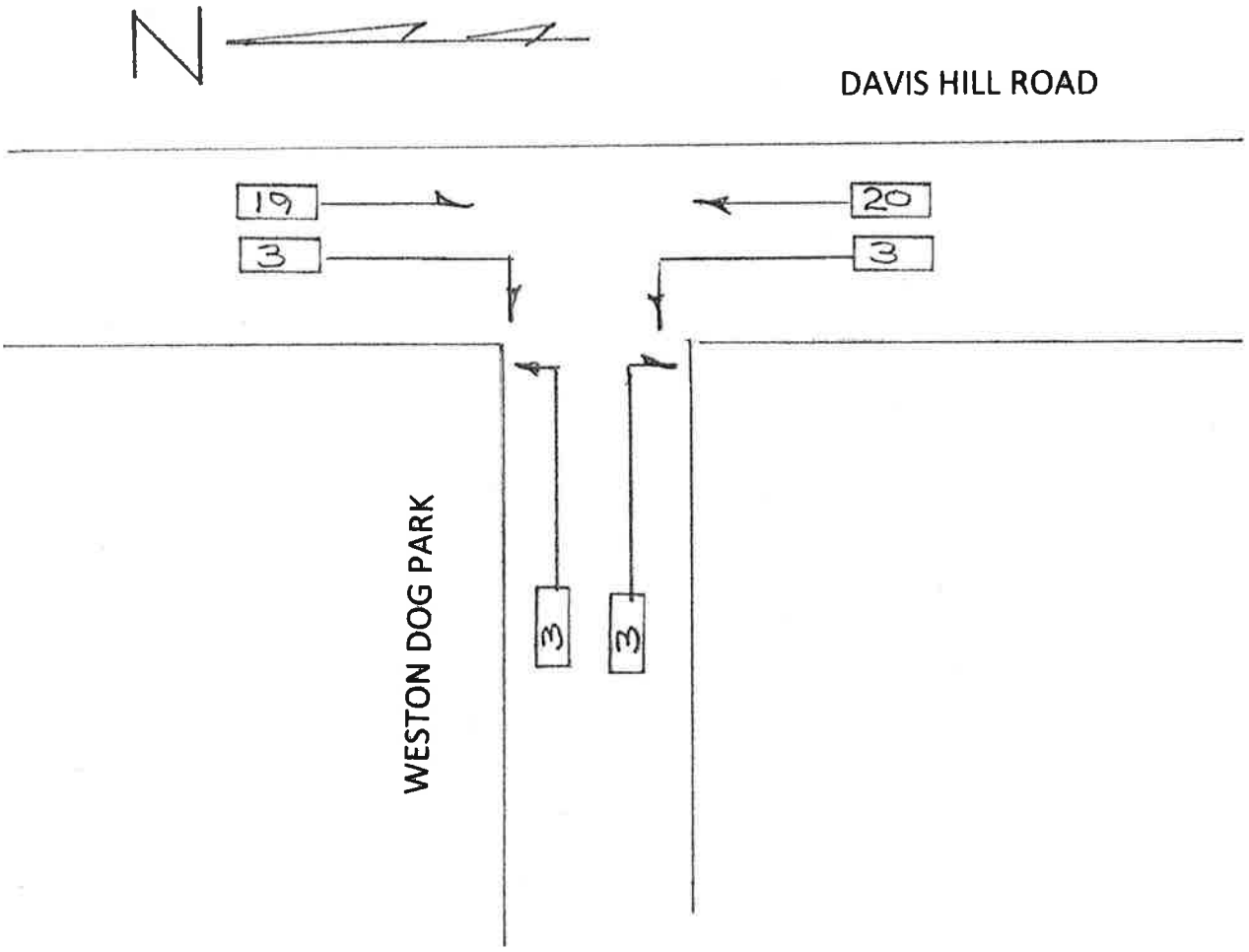
RECOMMENDED IMPROVEMENTS

1) Clear the sight line north of the proposed driveway by removing trees and vegetation to the recommended distance in the report. Lower the shoulder in the same location to achieve the required sight line. See Sight Line Improvements Weston Dog Park Davis Hill Road.
2) Place 25 mph speed limit signs at the required distances from the proposed driveway in the south bound and north bound lanes, as indicated in this report.
3) Place warning signs stating Park Entrance Ahead at the required distances from the proposed driveway in the south bound and north bound lanes, as indicated in this report.

This report documents that the proposed intersection of Davis Hill Road at the site driveway can accommodate the proposed site traffic with little noticeable change in operational efficiency and safety.

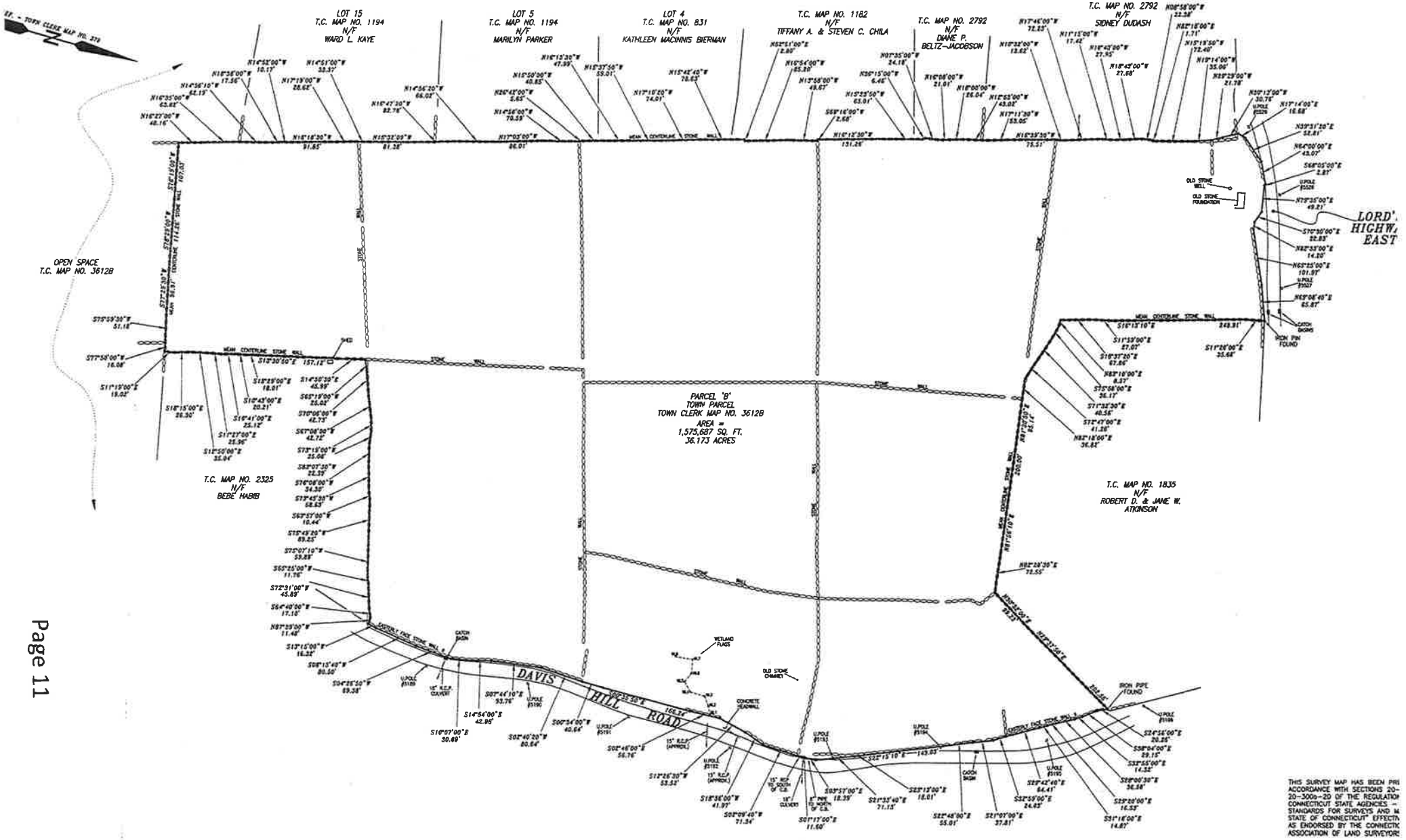
Figure 1

Peak Hour Volume
Year 2022
5pm to 6pm



APPENDIX "A"

SITE PLANS



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PROPERTY SURVEY

PREPARED FOR

THE TOWN OF WESTON

DAVIS HILL ROAD & LORD'S HIGHWAY

TOWN OF WESTON FAIRFIELD COUNTY, CT.

AUG. 19, 2016 SCALE: 1" = 80'

TO TOWN CLERK MAP NOs. 378, 521, 1596, 1835, 2325, 2792, 3612A & STON LAND RECORDS.

ENTS A DEPENDENT RESURVEY OF PARCEL" AS DEPICTED ON T.C. MAP

OUND OR SET DEPICTED HEREON.

160' 240'

THIS SURVEY MAP HAS BEEN PRI ACCORDANCE WITH SECTIONS 20- 20-300b-20 OF THE REGULATION CONNECTICUT STATE AGENCIES -- STANDARDS FOR SURVEYS AND M STATE OF CONNECTICUT" EFFECTI AS ENDORSED BY THE CONNECTIC ASSOCIATION OF LAND SURVEYOR

IT IS A PROPERTY SURVEY BASED DEPENDENT RESURVEY OF EXISTIN

THIS SURVEY MEETS CLASS A-2

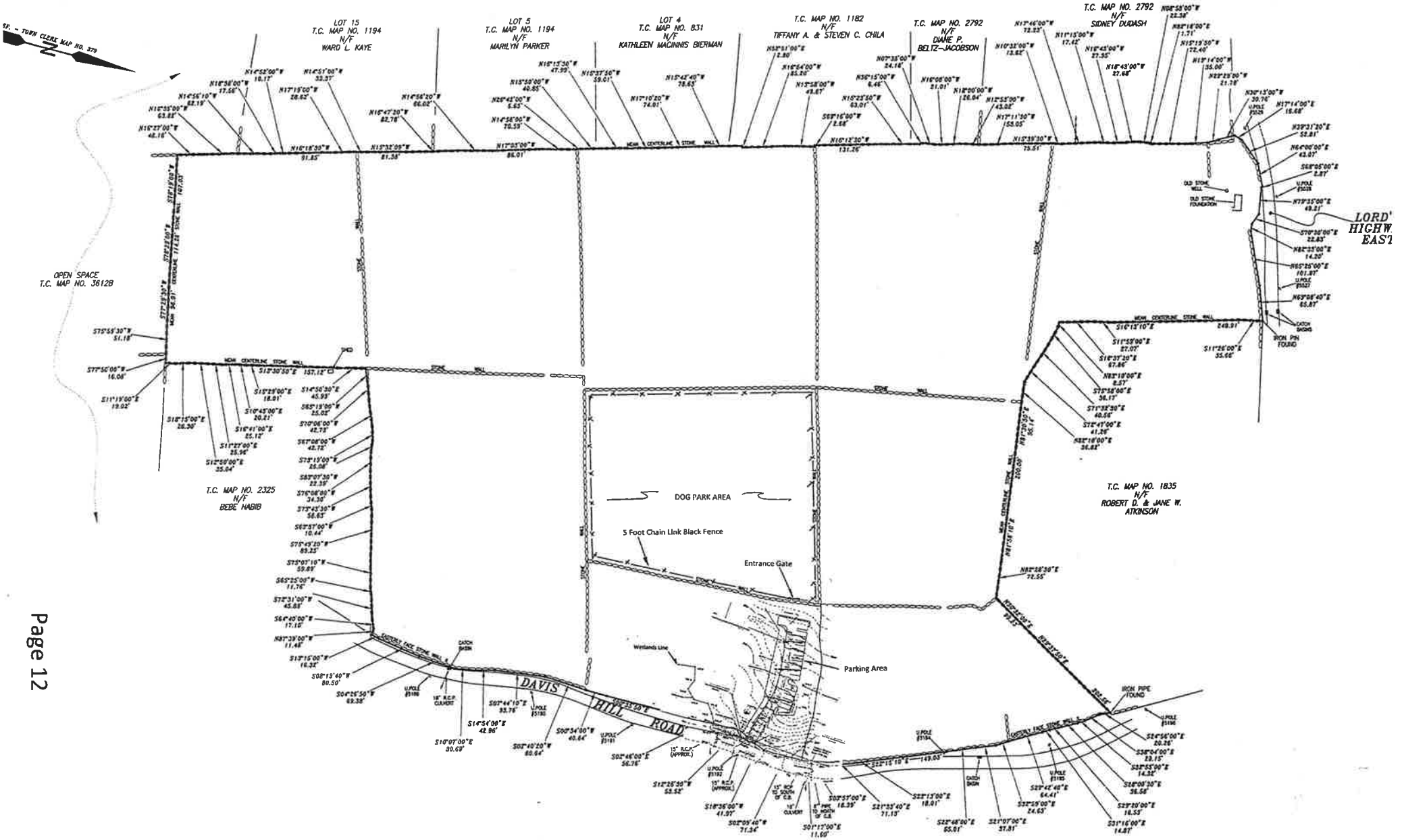
TO THE BEST OF MY KNOWLEDGE THIS MAP IS SUBSTANTIALLY CORR NOTED HEREON.

PREPARED BY THE OFF

PAH, INC. ~ LAND SU

35 DANBURY ROAD NEW MI

PAUL A. HINE, L.S. ~ ST. REG. NO.



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NOTE TO TOWN CLERK MAP Nos. 379, 521, 194, 1596, 1835, 2325, 2792, 3612A & E WESTON LAND RECORDS.

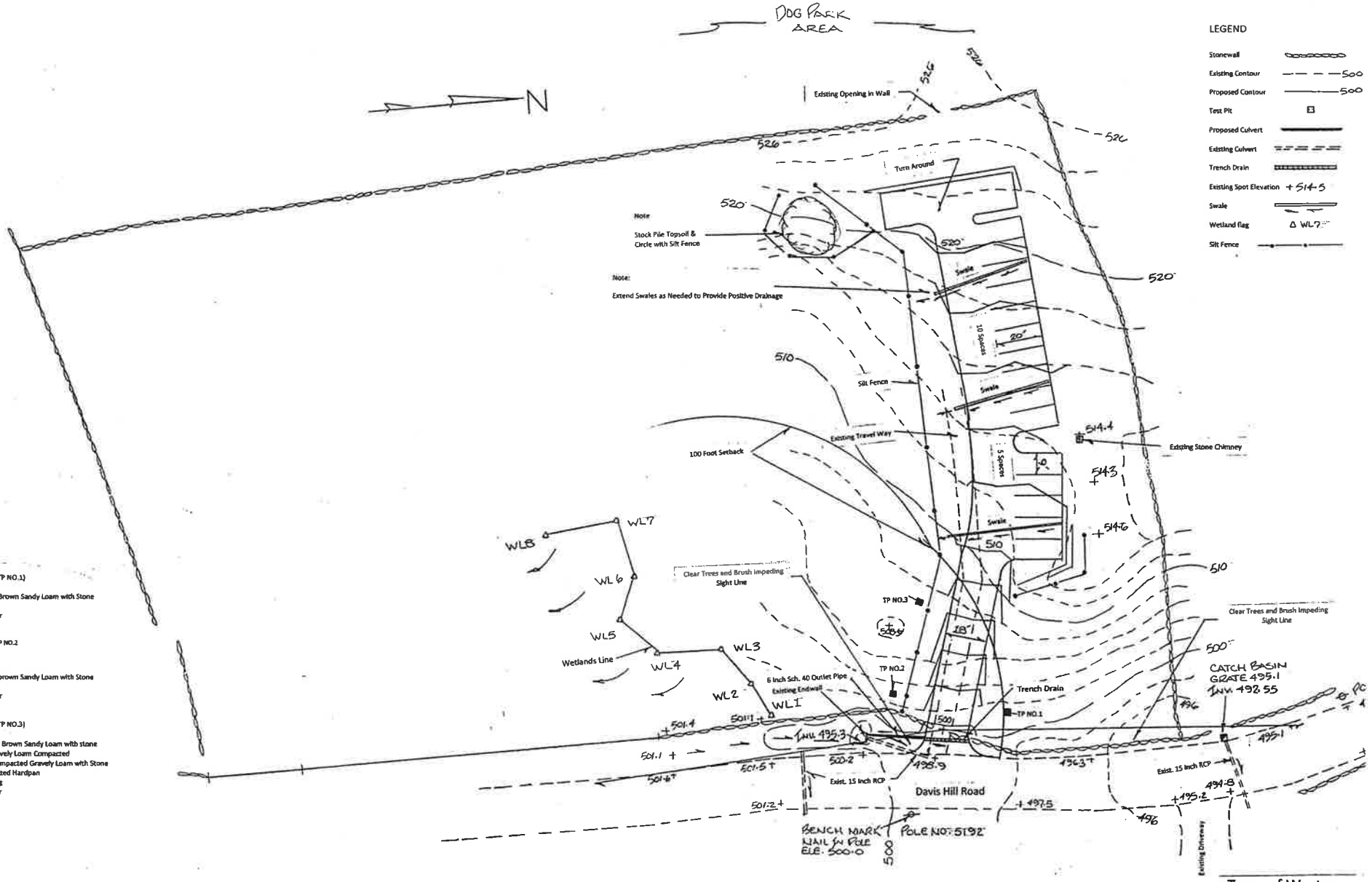
*REPRESENTS A DEPENDENT RESURVEY OF MAIN PARCEL" AS DEPICTED ON T.C. MAP

IRON FOUND OR SET DEPICTED HEREON.

80' 160' 240'

LOCATION PLAN
OF
DOG PARK & PARKING AREA

Page



TEST PIT NO.1 (TP NO.1)
0"-2" Top Soil
2"-24" Reddish Brown Sandy Loam with Stone
24" Ledge
No Groundwater
No Mottling

TEST PIT NO .2 (TP NO.2

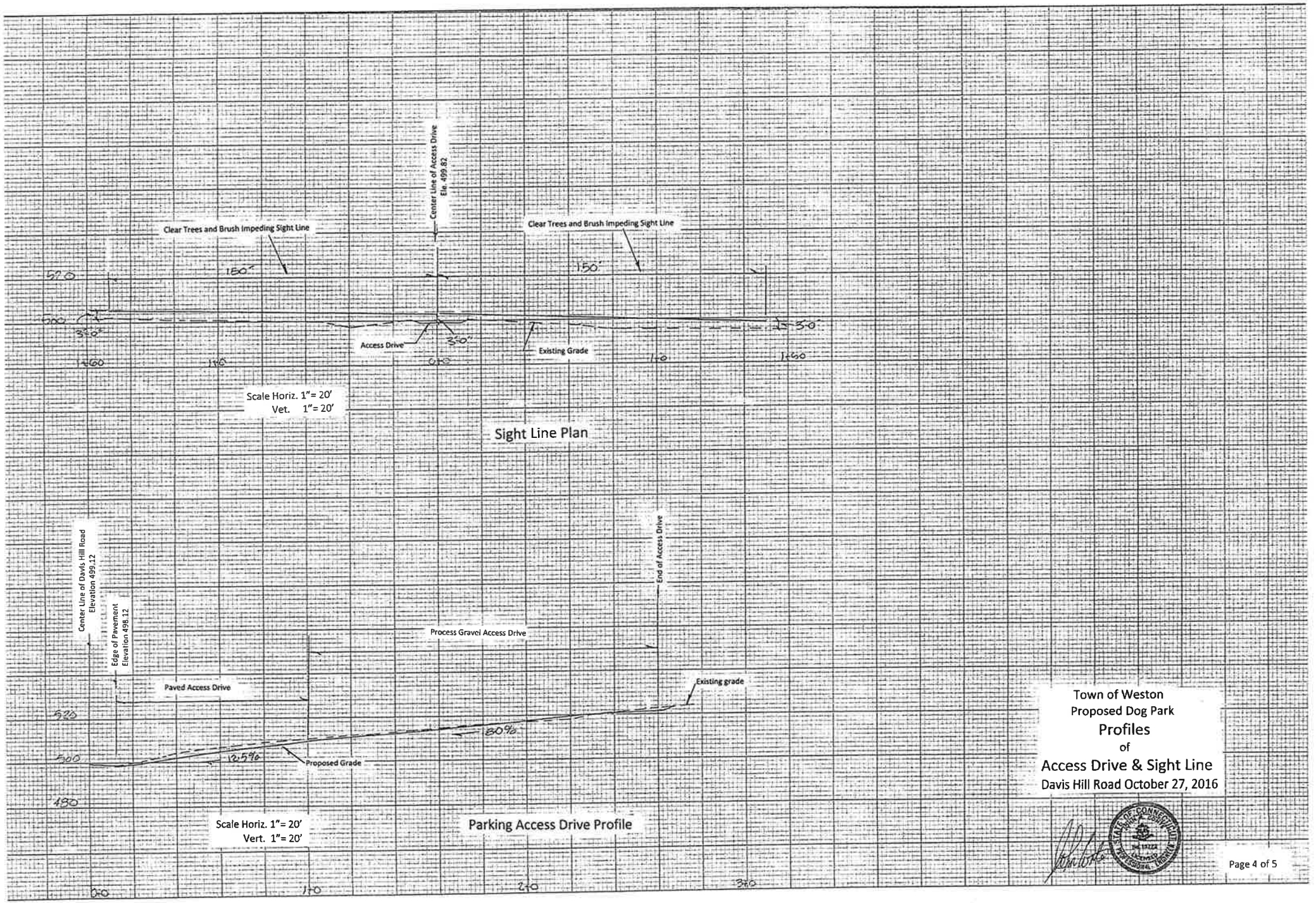
0"-2" Top Soil

2"-30" Reddish brown Sandy Loam with Stone
30" Ledge
No Groundwater
No Mottling

TEST PIT NO.3 (TP NO.3)
0"-2" Top Soil
2"-17 Reddish Brown Sandy Loam with stone
17"-38 Tan Gravely Loam Compacted
38"-62" Grey Compacted Gravely Loam with Stone Compacted Hardpan
38" Mottling
No Groundwater
No ledge

Note
1. Boundary Survey by PAH, INC Land Surveyors
2. Topographic Survey by John Conte P.E.
3. Wetland Soils Boundary by Otto R. Theall Soil Scientist

Town of Weston
Site Plan
Proposed Dog Park
Davis Hill Road
October 27, 2016


Center Line of Access Drive
Ele. 499.82
Clear Trees and Brush Impeding Sight Line
Clear Trees and Brush Impeding Sight Line
150'
150'
Access Drive
Existing Grade
Scale Horiz. 1"= 20'
Vet. 1"= 20'
Sight Line Plan
Center Line of Davis Hill Road
Elevation 499.12
Edge of Pavement
Elevation 498.12
End of Access Drive
Process Gravel Access Drive
Paved Access Drive
Existing grade
Proposed Grade
Scale Horiz. 1"= 20'
Vert. 1"= 20'
Parking Access Drive Profile
Town of Weston
Proposed Dog Park
Profiles
of
Access Drive & Sight Line
Davis Hill Road October 27, 2016

Construction Notes
Standard Specifications
for
Roads & Incidental Construction

SECTION 2.09
SUBGRADE

2.09.01—Description: The area upon which the pavement structure and paved shoulders are placed, including the shoulder base courses and subbase, shall be known as the subgrade. This is the plane coincident with the bottom of the subbase and the edge of pavement, as shown on the plans and cross-sections or as ordered by the Engineer. The work of formation of subgrade shall be performed at this plane.

Where precast concrete barrier curb is to be permanently installed, the work of formation of subgrade shall be performed on the area under the precast concrete barrier curb.

Where shoulders are to be reconstructed and the existing subbase is to remain, the work of formation of subgrade shall be performed at the plane coincident with the surface of the existing subbase.

After all grading has been substantially completed and all drains laid, the subgrade shall be brought to the lines, grades and cross-sections shown on the plans.

When no item for "Clearing and Grubbing" and no grading items appear in the proposal, the work of clearing waterways, ditches, drainage structures and culverts, as described in Article 2.01.03, shall be performed as part of this work.

2.09.02—Construction Methods: All soft and yielding material and other portions of the subgrade which will not compact readily shall be removed and replaced with suitable material.

In cut areas, the surface shall be uniformly compacted by use of equipment specifically manufactured for that purpose. Rollers shall deliver a ground pressure of not less than 300 pounds per linear inch (52.5 newtons/millimeter) of contact width and weigh not less than 10 tons (have a mass of not less than 9100 kilograms). Vibratory units shall have a static weight of not less than 4 tons (mass of not less than 3650 kilograms). The amount of compactive effort shall be as directed by the Engineer, but in no case shall be less than four (4) complete passes of the compacting equipment being used.

The dry density after compaction shall be as specified in Subarticle 2.02.03-6.

Where more than one compacting unit is to be used, that unit which exerts the larger compactive effort shall make the initial passes. Any portion of the subgrade not accessible to larger compacting units shall be compacted, as directed by the Engineer, to a degree equal to that obtained on the other portions of the subgrade with equipment and by methods appropriate to the size of the inaccessible area.

After compacting, the subgrade shall be true to required line and grade. There will be no direct payment for any materials required to bring the subgrade to the line, grade and cross-section shown on the plans.

The Contractor shall protect the completed subgrade from damage by exercising such precautions as the Engineer deems necessary. The subgrade surface shall be maintained in such condition as to permit proper drainage. It shall be checked and approved by the Engineer prior to placing any pavement structure and shoulders thereon.

SECTION 3.02
ROLLED GRANULAR BASE

3.02.01—Description: This base shall consist of one or more courses constructed on the prepared subbase in accordance with these specifications and in conformity with the lines, grades, compacted thickness and typical cross-section as shown on the plans.

3.02.02—Materials: ¾ Inch Processed Aggregate

3.02.03—Construction Methods: Bases or 6 inches (150 millimeters) or less in specified depth may be constructed in one course; bases over 6 inches (150 millimeters) in specified depth shall be constructed in two courses of equal depth.

Gravel or reclaimed miscellaneous aggregate shall be spread upon the prepared subbase to such depth that this course will be of the specified depth after final compaction. If, after the material has been spread and shaped, it is found that additional binder is necessary, it shall be furnished and applied in an amount directed by the Engineer. Such binder material shall be carefully and uniformly incorporated with the material in place by scarifying, harrowing, blading or other approved methods. The material shall then be shaped, wetted and compacted with a power roller with a mass of not less than 10 tons (9 metric tons) or an equivalent vibratory roller or compactor until thoroughly compacted. All areas of segregated coarse or fine material shall be corrected or removed and replaced with well-graded material, as directed by the Engineer. The compacting and wetting shall be continued until all voids are filled, after which this portion may be left to dry. The compacting shall be continued until the course is thoroughly compacted to a firm and uniform surface satisfactory to the Engineer. The material shall be re-compacted and wetted on succeeding days. The rate and extent of the compacting and the quantity and method of applying water shall be as directed by the Engineer.

After the first course has been compacted and bound as specified herein, the succeeding course, if necessary in order to achieve the specified base depth, shall be similarly placed.

SECTION 2.01
CLEARING AND GRUBBING

2.01.01—Description: This work shall consist of clearing the ground of trees, stumps, brush, rubbish and all objectionable material in accordance with these specifications or as directed by the Engineer. This work shall also include the clearing of the ground necessary for the construction and installation of drainage, structures, ditches, channels, fences and other appurtenances. Included in this work shall be the preservation from injury or defacement of vegetation and objects designated to remain.

2.01.03—Construction Methods: The Contractor shall mark all trees, shrubs and plants to be removed in accordance with the plans and these specifications. The Engineer shall have 7 days to field review the markings and make any adjustments prior to the start of the clearing operation. Within the excavation lines all trees shall be cut off and stumps removed to a depth of not less than 12 inches (300 millimeters) below the graded surface.

Within the fill lines where an embankment is to be made not more than 5 feet (1.5 meters) in depth, trees, stumps, roots, etc., shall be removed. Where the embankments to be made exceed 5 feet (1.5 meters) in depth, trees, stumps, roots, etc., shall be cut off to within 6 inches (150 millimeters) of the ground surface.

In areas where clearing is necessary for the construction and installation of various appurtenances, all trees and stumps shall be cut flush with the ground; and all dead or uprooted trees, brush, roots or otherwise objectionable material shall be removed as directed unless otherwise indicated on the plans.

Prior to clearing operations, a meeting must be held. Those attending the meeting should include the Contractor, the Engineer, the designer, local tree warden or equivalent, and the District Environmental Coordinator. All clearing issues shall be resolved to the satisfaction of the Engineer before any trees are cut.

All trees scheduled to be removed outside of the proposed gutter or curblines shall be visibly marked or flagged by the Contractor at least seven days prior to cutting of such trees.

The Engineer will inspect the identified trees within 7 days of the marking of the trees and verify the limits of clearing and grubbing prior to the Contractor proceeding with his cutting operation.

All branches of trees extending within the roadway shall be trimmed as directed to provide a 16-foot (5-meter) minimum vertical clearance including selective trimming of such trees as directed.

The Contractor shall dispose of all such trees, stumps, brush, etc., in a satisfactory manner and shall remove all rubbish and refuse from within the highway limits.

All excavations made below subgrade surface by the removal of trees, stumps, etc., shall be filled with suitable material, which shall be compacted thoroughly in accordance with the provisions governing formation of embankments.

SEDIMENTATION AND EROSION CONTROL PLAN

INTENT: It is the intent of this Sedimentation and Erosion Control Plan to provide the site contractor the means to control erosion and sedimentation from existing watercourses and drainage systems, and on to surrounding properties and roadways. The contractor shall use this plan, along with the guidelines provided, contain sediments within specifically noted areas as listed on this plan.

AGENT RESPONSIBLE FOR IMPLEMENTATION OF PLAN: Town of Weston, CT

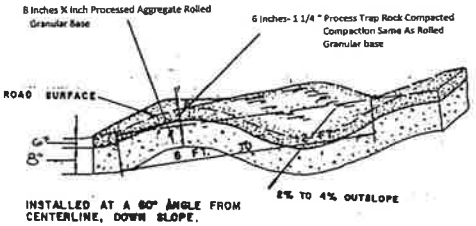
The following are deemed potential areas requiring proper sedimentation and erosion control measures:

a. lower grades of excavation areas
b. bottom of slopes with excavation areas
c. storm sewers, including existing and proposed catch basins
d. dust and mud control on surrounding streets and properties

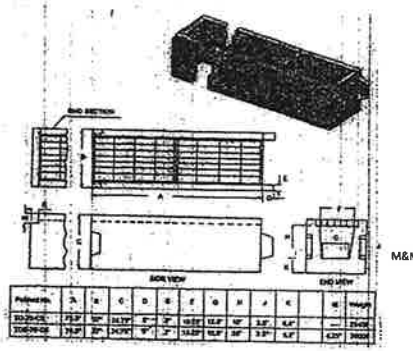
This plan deals with these potential sources of sediment by proposing silt/straw fences and checks, and requiring prompt stabilization of exposed slopes.

SEQUENCE OF SITE DEVELOPMENT AND INSTALLATION OF CONTROL MEASURES:

1. All areas of proposed construction activities and required sedimentation control measures shall be determined in the field and reviewed for completeness. All known perimeter siltation fences shall be installed, as field conditions require. All construction traffic shall be confined to anti-tracking entry pads, as shown on plans.
2. Topsoils to be stripped in areas of proposed activities and, stockpiled on-site, as shown on plan, or as approved by the owner.
3. Proposed bulk filling and excavation to begin, as shown on approved site plans, additional controls to be added as field conditions require. Slopes of exposed soils to be final graded, loamed and seeded, as soon as practical, to prevent unnecessary erosion of embankments.
4. Install utility service lines site, and connect as shown on approved plans. Provide additional sediment control measures as field-ideal circumstances may require.
5. Final grading of slopes to be completed, including placing and final grading of topsoil and seeding.
6. Install final landscaping and lawn areas, as required by owner.
7. Sedimentation control measures to be removed after vegetation is fully established on slopes and other potential areas of erosion have been completed
8. Parking lot and surrounding roads to be cleaned of silt and dirt due to construction. Catch basins and storm drains to be cleaned of any accumulated silt. Downstream culverts and/or watercourses to be inspected, and cleaned, of any deposited silt due to construction

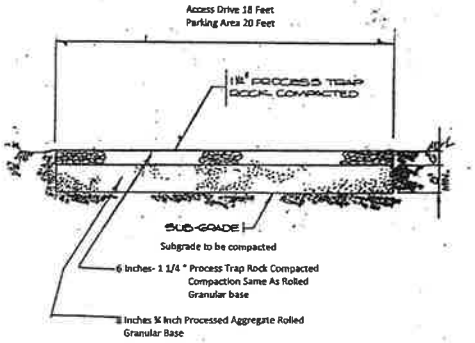


Access Drive Swale Detail

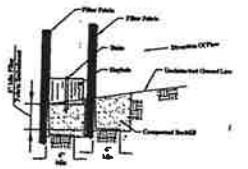


M&M PRECAST or EQUA

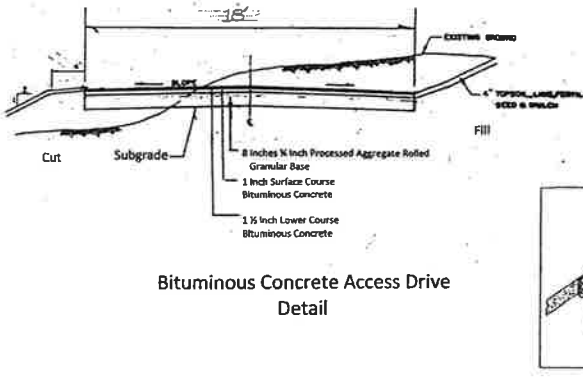
Trench Drain



Access Drive & Parking Area Detail



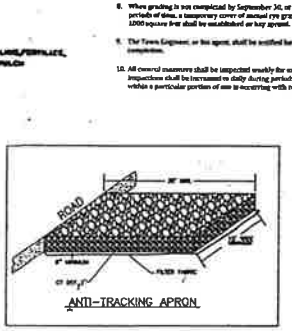
DOUBLE SILT FENCE W/ HAYBALE
N.T.S.



Bituminous Concrete Access Drive Detail

SEDIMENTATION & EROSION CONTROL NOTES:

1. All embankment slopes, disturbed or re-graded during construction shall be seeded or sodded and mulched (as required), as soon as practical after completion of slopes.
2. Synthetic filter fabric barriers or hay bales shall be placed as shown on this plan to control sedimentation and erosion. Refer to detail for proper installation requirements.
3. All perimeter synthetic filter checks or barriers shall be placed prior to starting of any site construction.
4. Prior to construction, all areas to be disturbed in a particular location shall be stripped of topsoil and stockpiled in an appropriate location. Hay bales or synthetic filter barriers shall be placed around the perimeter of the pile. Topsoil shall be immediately seeded with a temporary cover of annual rye grass.
5. Hay bales or synthetic filter barriers shall be placed at ends of all swales, either permanent or temporary, immediately after swale has been rough graded.
6. Hay bales checks shall be placed around catch basins after completion to prevent siltation of sumps. Refer to detail for proper installation requirements.
7. Areas shall be mulched or seeded immediately after final grading between April 1 and June 15, and between August 15 and September 30.
8. Where grading is not completed by September 30, or areas to be exposed for extended periods of time, a temporary cover of annual rye grass seeded at the rate of 1.5 pounds per 1000 square feet shall be established or hay mulch.
9. The Town Engineer, or his agent, shall be notified before construction begins and upon completion.
10. All control measures shall be inspected weekly for excessive accumulations of silt. These inspections shall be increased to daily during periods of rain or when excessive erosion within a particular portion of site is occurring with regularity.
11. Control measures shall be cleaned of silt when depth accumulations reach ½ the given height.
12. All control measures are to be removed from site immediately after work has been completed and ground cover has been established. Periodic review of the site may be required to inspect the site to insure that graded embankments maintain vegetation is established. In the event that ground cover has not been full established in a particular area additional measures may need to be taken to reestablish the ground cover.
13. Existing storm sewers, watercourses, and catch basins shall be cleaned of any accumul of silt due to construction.
14. Contractor to keep roadway free and clear of any accumulated mud or silt during construction. Measures to be used may include either sweeping, application of water or as road-lining techniques.
15. Mulching shall be required in addition to seeding after September 20th.
16. Areas which have been temporarily or permanently seeded shall be mulched immediat following seeding. Mulch anchoring will be used on slopes greater than 3 percent and constructed flow areas such as diversions and earlier waterway channels.
17. Organic mulch may be used in any area where mulch is required. The use of straw or hi the rate of 1.5-2 tons/acre or 70-90lbs/1000 S.F. and be free of weeds and coarse materials and must be anchored and spread with a mulch blower or by hand.
18. All mulches must be inspected periodically, in particular after rainstorms, to check for f erosion. Where erosion is observed, additional mulch should be applied. Net should be inspected after rainstorms for dislocations or failure. If washouts or breakage occurs, re-install as necessary after repairing damage to the slope(s). Inspections should take p until ground areas are firmly established to control soil erosion and to survive severe weather conditions.
19. Where slopes have eroded, and subsequent repair measures have failed to provide a stabilized embankment, use of erosion control blankets shall be required. Blankets shall selected and installed in accordance with manufacturers recommendations.
20. Installation of all control measures to be done in accordance with the "Guidelines for Soil Water Control-1988 in Connecticut", the Connecticut Council on Soil and Water Conservation, Inc. 1988, or as amended. Additional control measures may have to be add to the site construction areas where surface erosion or sediment control is a problem. Th above referenced manual shall be used as the basis for these additional control measures



ANTI-TRACKING APRON

Revision No. 1 3-22-17 Double Silt Fence with Hay Bales

Town of Weston
Construction Notes & Details
Proposed Dog Park
Davis Hill Road
October 27, 2016

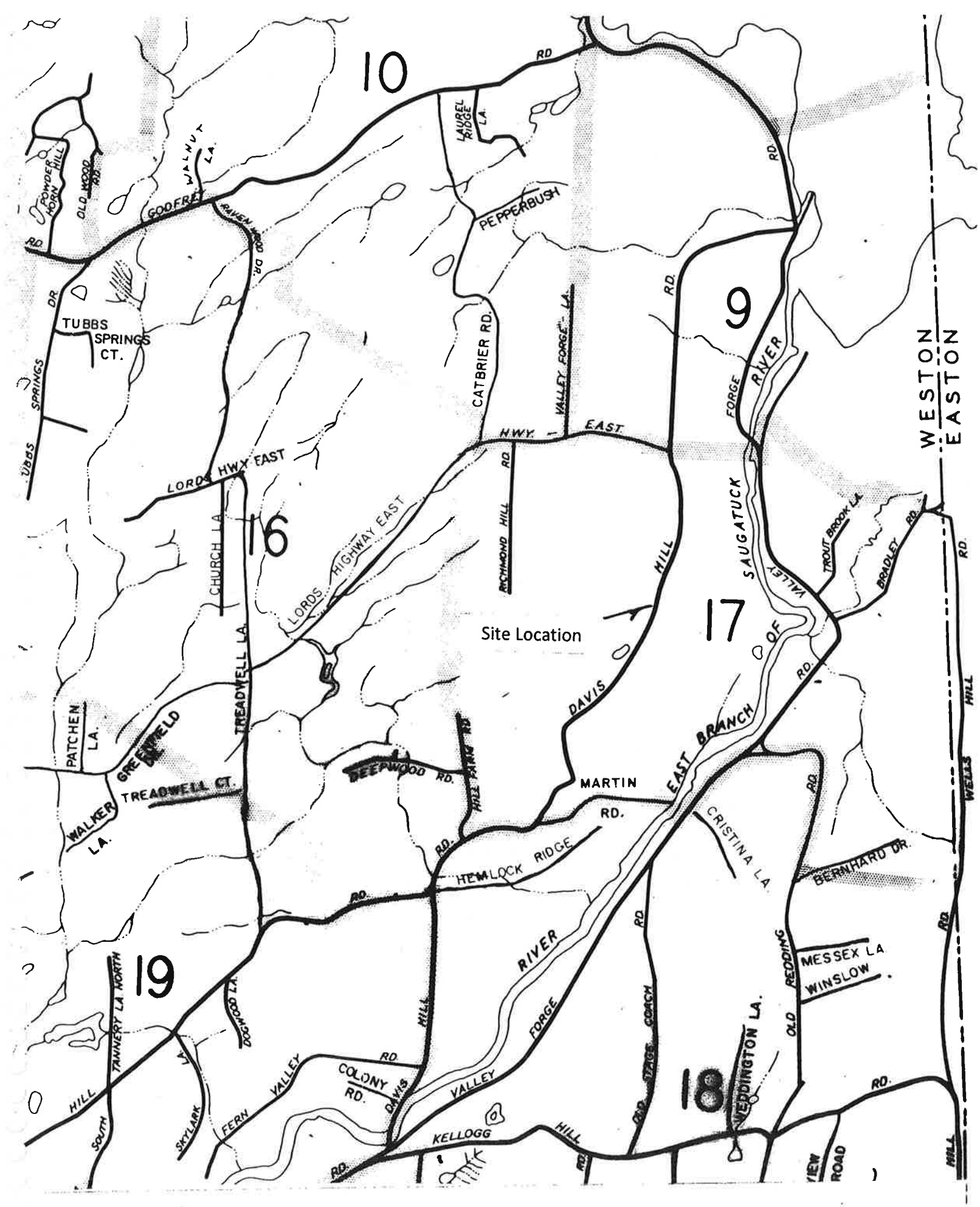
Page 5 o

Page 15

SITE LINE IMPROVEMENTS BEING COMPLETED
By
THE TOWN ENGINEER'S OFFICE

APPENDIX "B"

LOCATION MAP

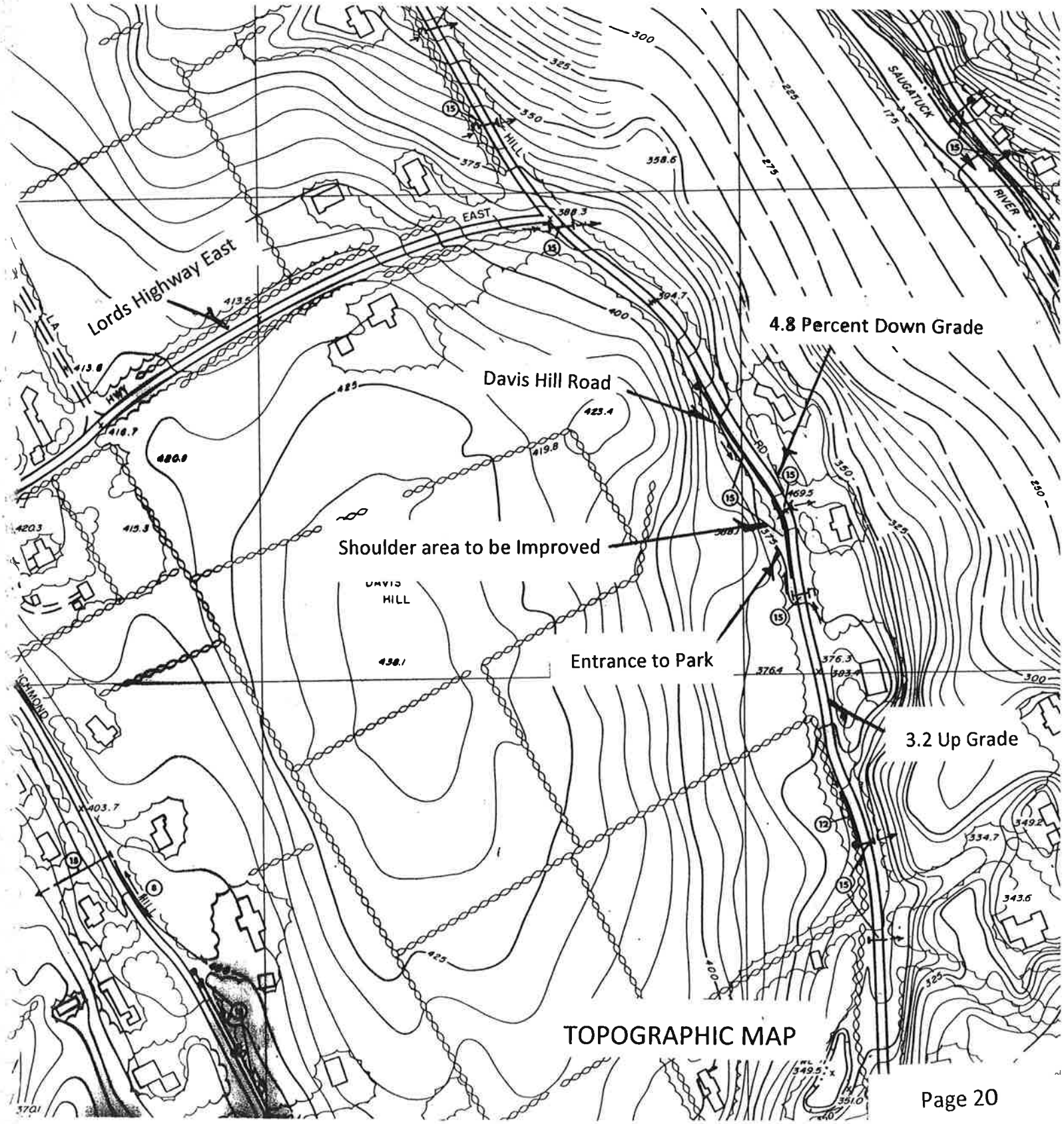


Proposed Weston Dog Park

Entrance Driveway Off Davis Hill Road

APPENDIX "C"

TOPOGRAPHIC MAP

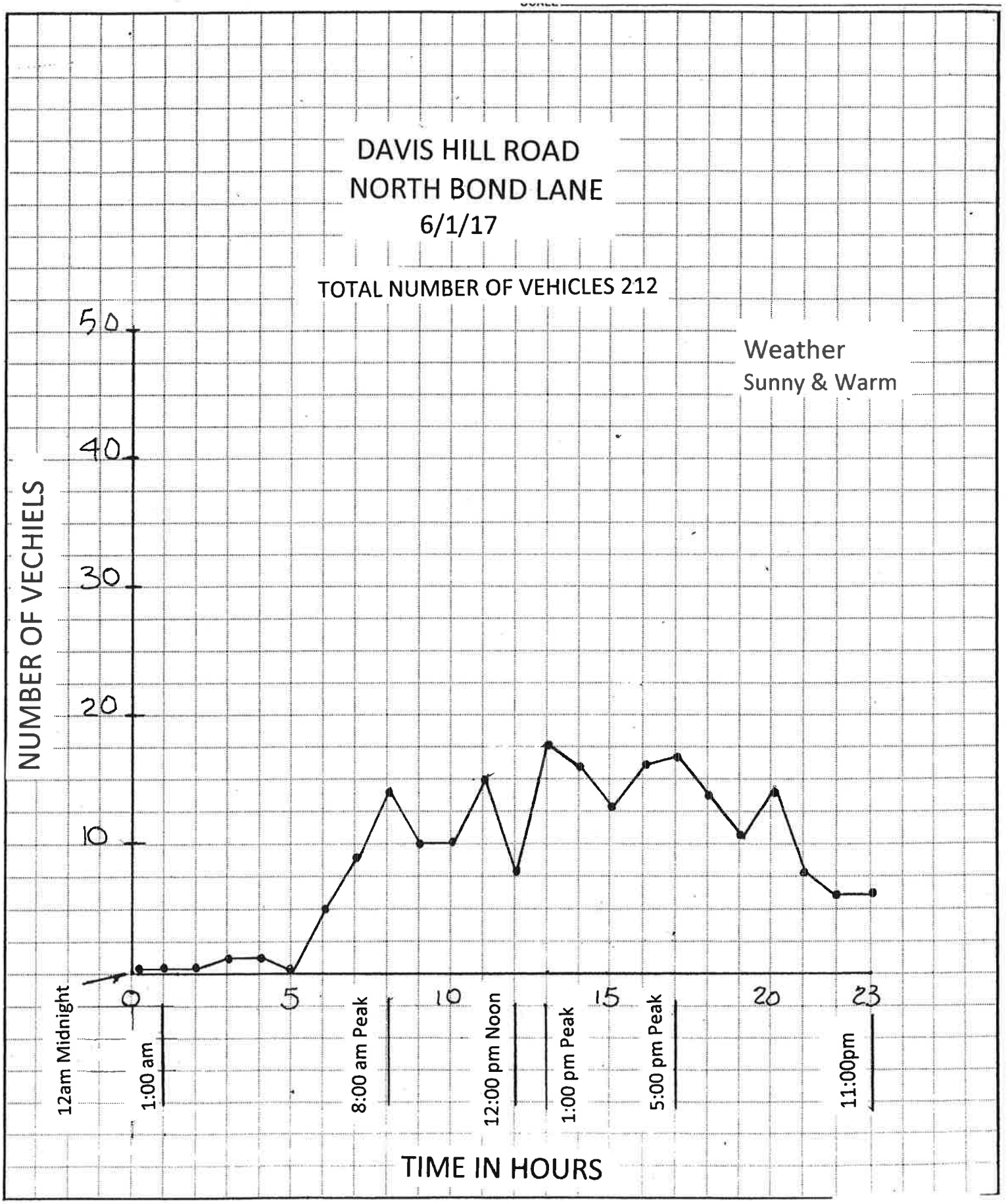


TOPOGRAPHIC MAP

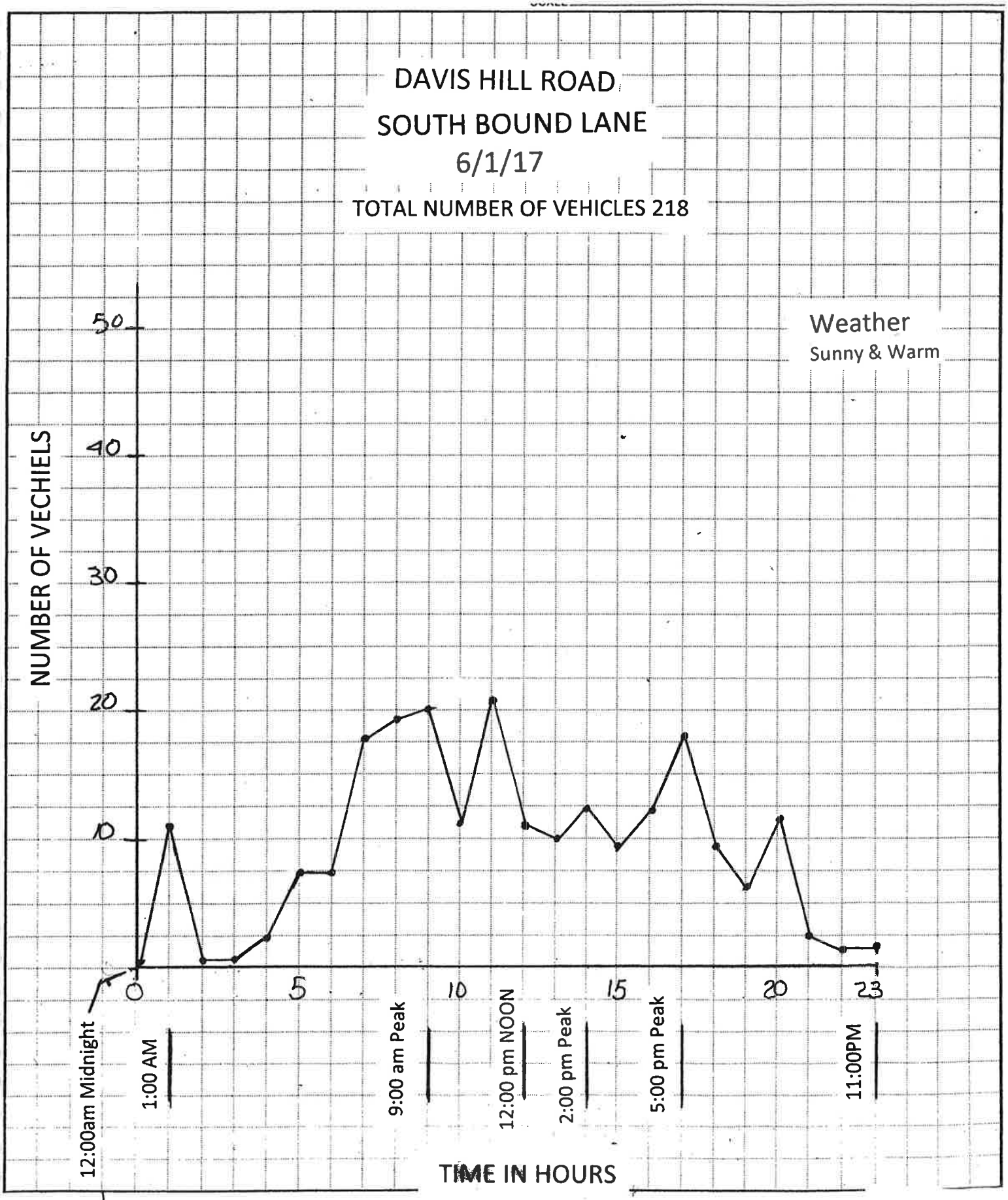
APPENDIX "D"

TRAFFIC COUNTS

Graphical Plot of Automatic Traffic Recorder (ATR) Counts
Automatic Traffic Recorder (ATR) with 24 Hour Counts



PRODUCT 204-1 NEBS Inc., Groton, Mass. 01471.



PRODUCT 204-1 NEBS Inc. Groton, Mass. 01471

North

ALL TRAFFIC SOLUTIONS

A sign of the future.™

Speed Summary Report

Generated by Rob Curcio from Town of Weston (CT)
on Jun 2, 2017 at 10:03:52 AM
Site: 117 Davis hill road, NB

Time of Day: 0:00 to 23:59
Dates: 5/26/2017 to 6/1/2017

Overall Summary

Total Days of Data: 2
Speed Limit: 25
Average Speed: 28.09
50th Percentile Speed: 27.00
85th Percentile Speed: 31.45
Pace Speed Range: 26 to 36

Minimum Speed: 5
Maximum Speed: 49
Display Status: Displayed Vehicle Speeds
Average Volume per Day: 218.5
Total Volume: 437

ALL TRAFFIC SOLUTIONS

A sign of the future.™

Volume By Time Report

Generated by Rob Curcio from Town of Weston (CT)
on Jun 2, 2017 at 10:04:38 AM
Speed Bins: Size 0, Range 1 to 100
Time View: By Day of Week (Avg Volumes)
Site: 117 Davis hill road, NB

Time of Day: 0:00 to 23:59
Dates: 5/26/2017 to 6/1/2017

Day of Week	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	Total Num Vehicles
Wednesda	0	0	0	0	0	13	1	7	19	8	15	8	13	18	18	14	10	20	21	15	9	8	5	2	224
Thursday	0	0	0	1	1	0	5	9	14	10	10	15	8	18	16	13	16	17	14	11	14	8	6	6	212
Avg #	0	0	0	1	1	7	3	8	17	9	13	12	11	18	17	14	13	19	18	13	12	8	6	4	218

South

ALL TRAFFIC SOLUTIONS

A sign of the future.™

Speed Summary Report

Generated by Rob Curcio from Town of Weston (CT)
on Jun 2, 2017 at 10:07:00 AM

Site: 143 Davis Hill , SB

Time of Day: 0:00 to 23:59
Dates: 5/26/2017 to 6/1/2017

Overall Summary

Total Days of Data: 2
Speed Limit: 25
Average Speed: 23.53
50th Percentile Speed: 23.65
85th Percentile Speed: 27.03
Pace Speed Range: 22 to 32

Minimum Speed: 5
Maximum Speed: 45
Display Status: Did Not Display Vehicle Speeds
Average Volume per Day: 164.0
Total Volume: 328

ALL TRAFFIC SOLUTIONS

A sign of the future.™

Volume By Time Report

Generated by Rob Curcio from Town of Weston (CT)
on Jun 2, 2017 at 10:06:20 AM
Speed Bins: Size 0, Range 1 to 100
Time View: By Day of Week (Avg Volumes)
Site: 143 Davis Hill , SB

Time of Day: 0:00 to 23:59
Dates: 5/26/2017 to 6/1/2017

Day of Week	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	Total Num Vehicles
Wednesda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	15	9	6	8	11	3	0	21	110
Thursday	0	11	0	0	2	7	7	18	19	20	11	21	11	10	12	9	12	18	9	6	11	2	1	1	218
Avg #	0	6	0	0	1	4	4	9	10	10	6	11	6	5	6	23	14	14	8	7	11	3	1	11	164

APPENDIX "E"

TIME GAP STUDY

TIME GAP STUDY
DAVIS HILL ROAD

June 8, 2017

DAVIS HIL ROAD
June 8, 2017

Hours of Study 7:30 am to 9:30 pm

South Bound Minutes & Seconds Per Vehicle Gap		North bound Minutes & Seconds Per Vehicle Gap	
2:00 + (2 minutes Plus)		0:41	1:24
2:00+		0:49	
2:00+	0:23	1:27	
2:00+	1:35	2:00+	
1:17	0:42	2:00+	
0:48	2:00+	1:37	
0:24	2:00+	2:00+	
2:00+	1:11	0:43	
0:36	2:00+	1:41	
2:00+	0:53	1:23	
2:00+	2:00+	0:56	
0:46	0:25	1:26	
1:18		2:00+	
2:00+		1:50	
1:41		0:32	
0:33		2:00+	
2:00+		1:49	
2:00+		1:58	
1:51		1:53	
0:23		0:43	
2:00+		1:45	
2:00+		2:00+	
1:51		2:00+	
0:23		2:00+	

DAVIS HIL ROAD
June 8, 2017

Hours of Study 12:00 pm to 1:30 pm

South Bound Minutes & Seconds Per Vehicle Gap	North bound Minutes & Seconds Per Vehicle Gap
2:00 + (2 minutes Plus)	2:00+
2:00+	2:00+
1:26	1:38
2:00+	0:59
2:00+	2:00+
2:00+	1:15
0:30	1:17
0:40	1:37
1:09	0:20
2:00+	
2:00+	

DAVIS HIL ROAD
June 8, 2017

Hours of Study 3:30 pm to 5:30 pm

South Bound Minutes & Seconds Per Vehicle Gap	North bound Minutes & Seconds Per Vehicle Gap
1:30	1:12
2:00+ (2 minutes Plus)	2:00+
2:00+	2:00+
0:27	2:00+
1:37	2:00+
1:52	0:18
2:00+	2:00+
1:10	2:00+
2:00+	2:00+
1:00	1:01
1:07	2:00+
2:00+	2:00+
	0:15
	0:15
	2:00+
	2:00+

APPENDIX "F"

ACCIDENT DATA

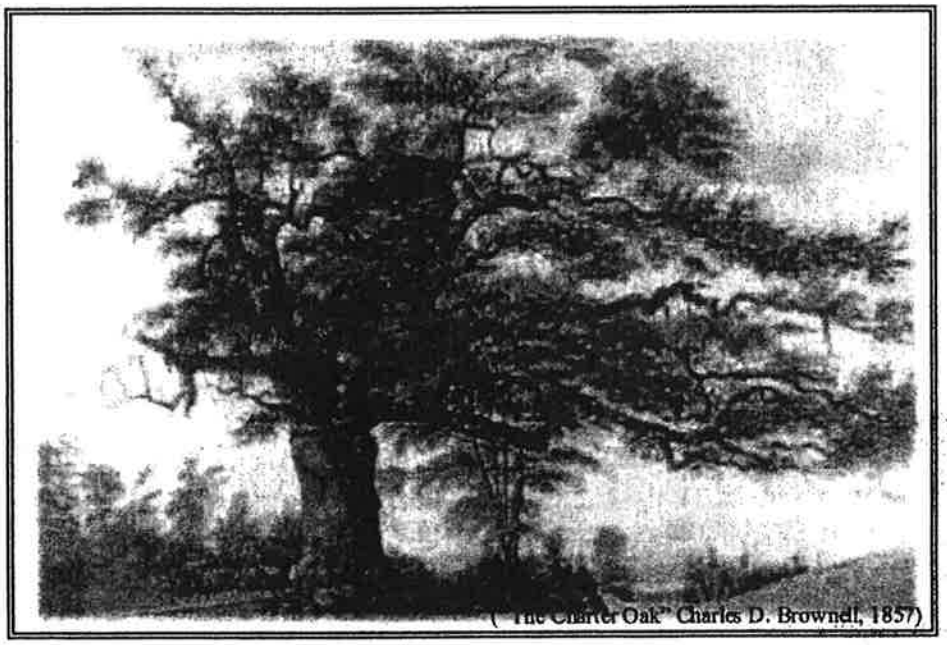
Weston Police Department
Press Report

ncident Num	Date	Recv	Ofc I.D.	Officer	Nature	Act	Rpt	Location	House Number	Apt
12-419	2/1/2012	19:16	28	Miceli	Motor Vehicle Accident	MV Investigation	Yes	Davis Hill Road		
12-1409	4/7/2012	22:36			Motor Vehicle Accident	MV Investigation	Yes	Davis Hill Road	# 100	
13-609	2/8/2013	19:13			Motor Vehicle Accident	MV Investigation	Yes	Davis Hill Road	# 103	
13-993	3/5/2013	14:25			Motor Vehicle Accident	MV Investigation	Yes	Davis Hill Road		
13-1198	3/17/2013	19:19	7	McInnis	Motor Vehicle Accident	MV Investigation	Yes	Davis Hill Road	# 54	
13-3968	8/4/2013	20:37	23	Forchione	Motor Vehicle Accident	MV Investigation	Yes	Davis Hill Road		
13-4177	8/16/2013	20:14	28	Miceli	Motor Vehicle Accident	MV Investigation	Yes	Davis Hill Road	# 167	
13-5210	10/14/2013	14:10			Motor Vehicle Accident	MV Investigation	Yes	Davis Hill Road		
13-6109	12/16/2013	17:12	19	Brodacki	Motor Vehicle Accident	MV Investigation	Yes	Davis Hill Road		
13-6117	12/17/2013	13:06	15	Ferullo	Motor Vehicle Accident	MV Investigation	Yes	Davis Hill Road	# 89	
14-2969	7/10/2014	12:06	24	Arnette	Motor Vehicle Accident	Cleared, No Action	No	Davis Hill Road	# 25	
14-3275	7/25/2014	23:06	31	McGraw	Motor Vehicle Accident	Department Info Only	No	10 Davis Hill Road	# 10	
14-4132	9/4/2014	3:22	21	Klein	Motor Vehicle Accident	MV Investigation	Yes	#47 Davis Hill Road		
14-5706	11/30/2014	19:06	24	Arnette	Motor Vehicle Accident	MV Investigation	Yes	Davis Hill Road		
15-53	1/3/2015	15:44	25	Mogollon	Motor Vehicle Accident	MV Investigation	Yes	Davis Hill Road	# 81	
15-5426	10/10/2015	0:01			Motor Vehicle Accident	Motor Vehicle Arrest	Yes	Davis Hill Road	# 4	
16-2374	4/22/2016	12:04	33	Heibeck	Motor Vehicle Accident	MV Investigation	Yes	Davis Hill Road		
16-3967	7/12/2016	11:12	30	Greenfield	Motor Vehicle Accident	MV Investigation	Yes	Davis Hill Road	# 103	
17-1412	2/21/2017	8:30	29	Cascone	Motor Vehicle Accident	MV Investigation	Yes	Davis Hill Road		

APPENDIX "G"

SAFE STOPPING SIGHT DISTANCE

CONNECTICUT DEPARTMENT OF TRANSPORTATION



HIGHWAY DESIGN MANUAL
2003 Edition

(U.S. Customary Units)

Design Speed (mph)	Downgrades			Level	Upgrades		
	-9% (ft)	-6% (ft)	-3% (ft)	0% (ft)	+3% (ft)	+6% (ft)	+9% (ft)
20	130	120	120	115	110	110	105
25	175	165	160	155	150	145	140
30	230	215	205	200	200	185	180
35	290	275	260	250	240	230	225
40	355	335	315	305	290	280	270
45	430	400	380	360	345	335	320
50	510	475	450	425	405	390	375
55	595	555	520	495	470	450	435
60	690	640	600	570	540	515	495
65	790	730	685	645	615	585	565
70	895	825	775	730	690	660	635

Notes:

1. *For grades intermediate between columns, use a straight-line interpolation to calculate SSD. For example:*

   V = 55 mph
   G = -4.3%

   $$SSD = 520 + \left(\frac{4.3 - 3}{6 - 3}\right)(555 - 520)$$

   = 520 + 15.2
   = 535.2 ft

2. *See Section 9-3.0 for application of SSD to crest and sag vertical curves.*

STOPPING SIGHT DISTANCE

Figure 7-1A

APPENDIX "H"

HIGHWAY CAPACITY MANUAL
ROADWAY CLASSIFICATIONS

The three classes of two-lane highways are defined as follows:

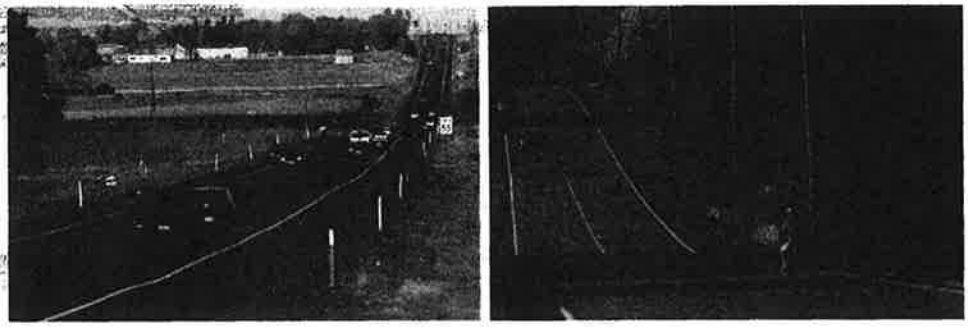
- *Class I two-lane highways* are highways where motorists expect to travel at relatively high speeds. Two-lane highways that are major intercity routes, primary connectors of major traffic generators, daily commuter routes, or major links in state or national highway networks are generally assigned to Class I. These facilities serve mostly long-distance trips or provide the connections between facilities that serve long-distance trips.
- *Class II two-lane highways* are highways where motorists do not necessarily expect to travel at high speeds. Two-lane highways functioning as access routes to Class I facilities, serving as scenic or recreational routes (and not as primary arterials), or passing through rugged terrain (where high-speed operation would be impossible) are assigned to Class II. Class II facilities most often serve relatively short trips, the beginning or ending portions of longer trips, or trips for which sightseeing plays a significant role.
- *Class III two-lane highways* are highways serving moderately developed areas. They may be portions of a Class I or Class II highway that pass through small towns or developed recreational areas. On such segments, local traffic often mixes with through traffic, and the density of unsignalized roadside access points is noticeably higher than in a purely rural area. Class III highways may also be longer segments passing through more spread-out recreational areas, also with increased roadside densities. Such segments are often accompanied by reduced speed limits that reflect the higher activity level.

Exhibit 15-1 shows examples of the three classes of two-lane highway.

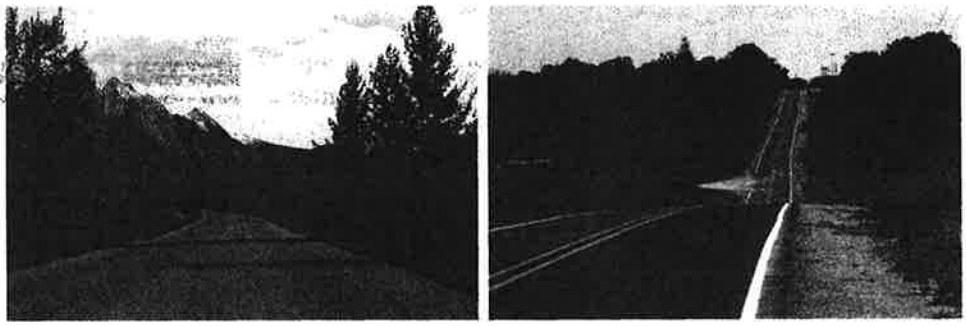
The definition of two-lane highway classes is based on their function. Most arterials or trunk roads are considered to be Class I highways, while most collectors and local roads are considered to be Class II or Class III highways. The primary determinant of a facility's classification is the motorist's expectation, which might not agree with the overall functional category of the route. For example, a major intercity route passing through a rugged mountainous area might be described as Class II if drivers recognize that high-speed operation is not feasible due to the terrain, but the route could still be considered to be in Class I.

Even Class III highways incorporate only uninterrupted-flow segments of two-lane highways. Occasional signalized or unsignalized intersections on any two-lane highway must be separately analyzed with the appropriate *Highway Capacity Manual* (HCM) methodologies in Chapter 18, Signalized Intersections, Chapter 20, All-Way STOP-Controlled Intersections, or Chapter 21, Roundabouts. The results must be carefully considered in conjunction with those of uninterrupted-flow portions of the facility to obtain a complete picture of probable operations.

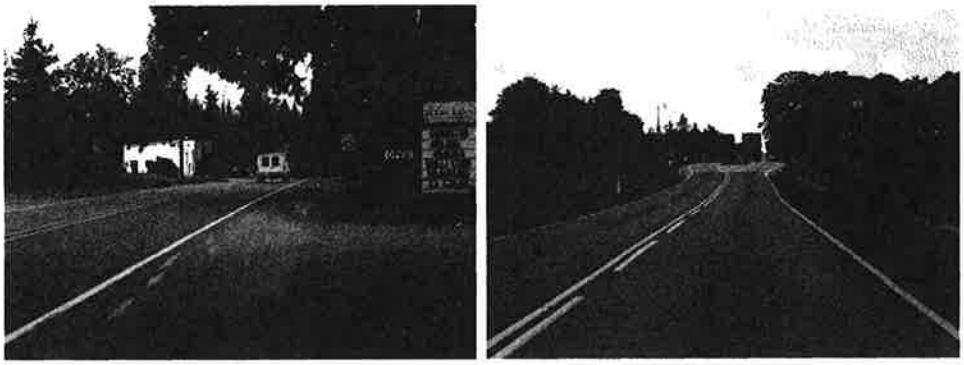
Exhibit 15-1
Two-Lane Highway
Classification Illustrated



(a) Examples of Class I Two-Lane Highways



(b) Examples of Class II Two-Lane Highways



(c) Examples of Class III Two-Lane Highways

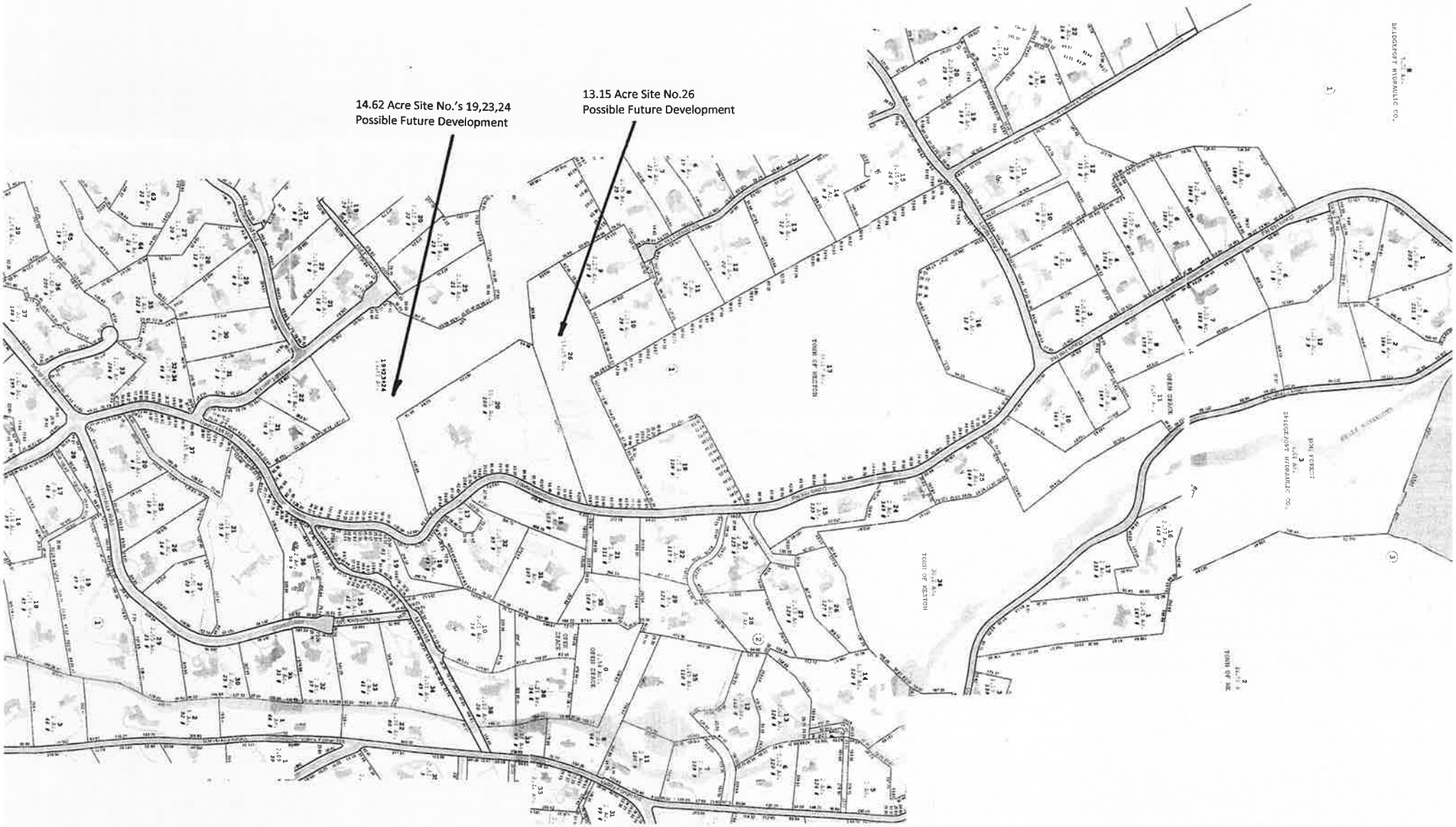
Base Conditions

The base conditions for two-lane highways are the absence of restrictive geometric, traffic, or environmental factors. Base conditions are not the same as typical or default conditions, both of which may reflect common restrictions. Base conditions are closer to what may be considered as ideal conditions (i.e., the best conditions that can be expected given normal design and operational practice). The methodology of this chapter accounts for the effects of geometric, traffic, and environmental factors that are more restrictive than the base conditions. The base conditions for two-lane highways are as follows:

- Lane widths greater than or equal to 12 ft,
- Clear shoulders wider than or equal to 6 ft,
- No no-passing zones,
- All passenger cars in the traffic stream,

APPENDIX "I"

FUTURE AREA GROWTH MAP


14.62 Acre Site No.'s 19,23,24
Possible Future Development
13.15 Acre Site No.26
Possible Future Development
19,23,24
TOWN OF WESTON
OPEN SPACE
BRIDGEPORT HYDRAULIC CO.

FUTURE AREA (

APPENDIX "J"

TWO LANE HIGHWAY USERS GUIDE

PERCENT TIME-SPENT-FOLLOWING

The Base Percent Time-Spent-Following ($BPTSF_d$) is estimated from HCM Equation 15-10, where *a* and *b* are constants drawn from HCM Exhibit 15-20. The Base Percent Time-Spent Following ($BPTSF_d$) is then adjusted using the No-Passing Zone Adjustment Factor ($f_{np,PTSF}$) from HCM Exhibit 15-21 to obtain the Percent Time-Spent-Following ($PTSF_d$) from HCM Equation 15-9.

PERCENT OF FREE-FLOW SPEED

The Percent of Free-Flow Speed (PFFS) is estimated from HCM Equation 15-11 and is included only in the analysis of Class III two-lane highways.

AUTOMOBILE LEVEL OF SERVICE AND PERFORMANCE MEASURES

In this section the calculated results of the Automobile analysis are displayed.

The Automobile Level of Service (LOS) is determined separately for Class I, Class II and Class III highways. Automobile Level of Service criteria for Two-Lane Highways from HCM Exhibit 15-3 for Class I, Class II and Class III highways respectively:

Class I:

	ATS (mi/h)	PTSF (%)
LOS A	>55	≤35
LOS B	>50-55	>35-50
LOS C	>45-50	>50-65
LOS D	>40-45	>65-80
LOS E	≤40	>80

LOS F exists whenever the demand flow in one or both directions exceeds the capacity of the segment.

Class II:

	PTSF (%)
LOS A	≤ 40
LOS B	>40-55
LOS C	>55-70
LOS D	>70-85
LOS E	>85

LOS F exists whenever the demand flow in one or both directions exceeds the capacity of the segment.

Class III:

	PFFS (%)
LOS A	> 91.7
LOS B	>83.3-91.7
LOS C	>75.0-83.3
LOS D	>66.7-75.0
LOS E	≤66.7

LOS F exists whenever the demand flow in one or both directions exceeds the capacity of the segment.

Next, the capacity is determined under the prevailing conditions. HCM Equation 15-12 or HCM Equation 15-13 (or both) are applied and capacity is computed.

BICYCLE MODE

The user codes the Posted speed limit, Percent of segment with occupied on-highway parking, and Pavement rating for the highway being analyzed. The Flow rate in the outside lane is then calculated using HCM Equation 15-24. The Effective width of the outside lane is calculated using either HCM Equation 15-25, 15-26, or 15-27 depending on the paved shoulder width. Then the Effective speed factor is calculated using HCM Equation 15-30.

APPENDIX "K"

HIGHWAY CAPACITY SOFTWARE
TRAFFIC VOLUMES YEAR 2017-2022

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	
Agency/Co.	WestCOG
Date Performed	7/24/2017
Analysis Time Period	Peak PM Hour 5 - 6 pm
Highway	Davis Hill Road
From/To	Lords Highway East/South 1800'
Jurisdiction	Weston
Analysis Year	2017
Description	Existing LOS

Input Data

Highway class	Class 3		Peak hour factor, PHF	0.88	
Shoulder width	0.0	ft	% Trucks and buses	2	%
Lane width	11.0	ft	% Trucks crawling	0.0	%
Segment length	0.3	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Rolling		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	20	/mi

Analysis direction volume, Vd 19 veh/h
Opposing direction volume, Vo 18 veh/h

Average Travel Speed

Direction	Analysis (d)		Opposing (o)	
PCE for trucks, ET	2.7		2.7	
PCE for RVs, ER	1.1		1.1	
Heavy-vehicle adj. factor, (note-5) fHV	0.967		0.967	
Grade adj. factor, (note-1) fg	0.67		0.67	
Directional flow rate, (note-2) vi	33	pc/h	32	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed, (note-3) S FM	30	mi/h
Observed total demand, (note-3) V	37	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, (note-3) BFFS	-	mi/h
Adj. for lane and shoulder width, (note-3) fLS	-	mi/h
Adj. for access point density, (note-3) fA	-	mi/h
Free-flow speed, FFSd	30.3	mi/h
Adjustment for no-passing zones, fnp	2.4	mi/h
Average travel speed, ATSd	27.4	mi/h
Percent Free Flow Speed, PFFS	90.4	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.9	1.9
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	0.982	0.982
Grade adjustment factor,(note-1) fg	0.73	0.73
Directional flow rate,(note-2) vi	30 pc/h	29 pc/h

Base percent time-spent-following,(note-4)	BPTSFd	3.8	%
Adjustment for no-passing zones, fnp		52.7	
Percent time-spent-following, PTSFd		30.6	%

Level of Service and Other Performance Measures

Level of service, LOS	B	
Volume to capacity ratio, v/c	0.53	
Peak 15-min vehicle-miles of travel, VMT15	2	veh-mi
Peak-hour vehicle-miles of travel, VMT60	6	veh-mi
Peak 15-min total travel time, TT15	0.1	veh-h
Capacity from ATS, CdATS	1690	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1690	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	0.3	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	27.4	mi/h
Percent time-spent-following, PTSFd (from above)	30.6	
Level of service, LOSd (from above)	B	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	21.6
Effective width of outside lane, We	20.95
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.31
Bicycle LOS	B

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	
Agency/Co.	WestCOG
Date Performed	7/24/2017
Analysis Time Period	Peak PM Hour 5 - 6 pm
Highway	Davis Hill Road
From/To	Lords Highway East/South 1800'
Jurisdiction	Weston
Analysis Year	2022
Description	2022 LOS with Dog Park

Input Data

Highway class	Class 3		Peak hour factor, PHF	0.88	
Shoulder width	0.0	ft	% Trucks and buses	2	%
Lane width	11.0	ft	% Trucks crawling	0.0	%
Segment length	0.3	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Rolling		% Recreational vehicles	0	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	20	/mi

Analysis direction volume, Vd 23 veh/h
Opposing direction volume, Vo 22 veh/h

Average Travel Speed

Direction	Analysis (d)		Opposing (o)	
PCE for trucks, ET	2.7		2.7	
PCE for RVs, ER	1.1		1.1	
Heavy-vehicle adj. factor, (note-5) fHV	0.967		0.967	
Grade adj. factor, (note-1) fg	0.67		0.67	
Directional flow rate, (note-2) vi	40	pc/h	39	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed, (note-3) S FM	30	mi/h
Observed total demand, (note-3) V	45	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, (note-3) BFFS	-	mi/h
Adj. for lane and shoulder width, (note-3) fLS	-	mi/h
Adj. for access point density, (note-3) fA	-	mi/h
Free-flow speed, FFSd	30.4	mi/h
Adjustment for no-passing zones, fnp	2.4	mi/h
Average travel speed, ATSd	27.3	mi/h
Percent Free Flow Speed, PFFS	90.1	%

Percent Time-Spent-Following

Direction	Analysis (d)		Opposing (o)	
PCE for trucks, ET	1.9		1.9	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	0.982		0.982	
Grade adjustment factor, (note-1) fg	0.73		0.73	
Directional flow rate, (note-2) vi	36	pc/h	35	pc/h
Base percent time-spent-following, (note-4) BPTSFd	4.5	%		
Adjustment for no-passing zones, fnp	52.7			
Percent time-spent-following, PTSFd	31.2	%		

Level of Service and Other Performance Measures

Level of service, LOS	B	
Volume to capacity ratio, v/c	0.53	
Peak 15-min vehicle-miles of travel, VMT15	2	veh-mi
Peak-hour vehicle-miles of travel, VMT60	7	veh-mi
Peak 15-min total travel time, TT15	0.1	veh-h
Capacity from ATS, CdATS	1690	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1690	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	0.3	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	27.3	mi/h
Percent time-spent-following, PTSFd (from above)	31.2	
Level of service, LOSd (from above)	B	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	26.1
Effective width of outside lane, We	20.74
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	2.44
Bicycle LOS	B

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

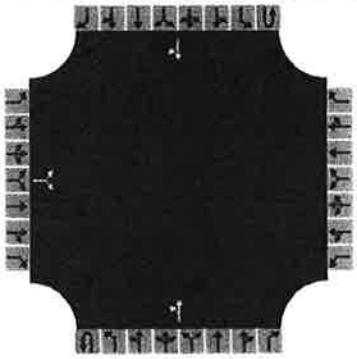
APPENDIX "I"

INTERSECTION ANALYSIS

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst		Intersection	Dog Park Driveway
Agency/Co.	WestCOG	Jurisdiction	Weston
Date Performed	7/24/2017	East/West Street	Dog Park Driveway
Analysis Year	2022	North/South Street	Davis Hill Road
Time Analyzed	PM Peak Hour 5 - 6 pm	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	1.00
Project Description	Proposed Dog Park		

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume, V (veh/h)		3		3						3	20				19	3
Percent Heavy Vehicles (%)		0		0						2						
Proportion Time Blocked																
Percent Grade (%)		-10														
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		4.40		5.20						4.12						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.22						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			6							3						
Capacity, c (veh/h)			1027							1590						
v/c Ratio			0.01							0.00						
95% Queue Length, Q_{95} (veh)			0.0							0.0						
Control Delay (s/veh)			8.5							7.3						
Level of Service, LOS			A							A						
Approach Delay (s/veh)		8.5								0.9						
Approach LOS		A														

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REFERENCES

1. Weston Police Department
2. Connecticut Department of Transportation
3. Western Connecticut Council of Governments
4. Highway Capacity manual